

### LIST OF CLAIMS

This listing of claims will replace all prior versions, and listings, of claims in the application.

1. (currently amended) A method for arbitrating for a switch fabric having a plurality of ports, each port from the plurality of ports having its own plurality of links, comprising:

determining, on a per port basis, a subset of links from the plurality of links associated with that port, each link from the determined subset of links for that port being associated with a candidate packet, each link from the plurality of links for that port being associated with a weight value; ~~and~~

selecting, on a per port basis, a link from the determined subset of links for that port based on the weight value for determined subset of links for that port;

determining if any of the plurality of links unassociated with the candidate packet has a corresponding weight value greater than the weight value of the link;  
and

if the corresponding weight value is greater than the weight value of the link, then the method includes,

decreasing the corresponding weight value.

2. (original) The method of claim 1, wherein the weight value for the selected link for that port is greater than the weight value associated with each remaining link from the determined subset of links for that port.

3. (original) The method of claim 1, wherein the weight value associated with each link from the plurality of links associated with that port corresponds to a priority for that port and a second port associated with that link.

4. (original) The method of claim 1, wherein the candidate packet associated with a link from the plurality of links is buffered at an input port associated with that link.
5. (original) The method of claim 1, wherein the determining and the selecting are performed on a per output port basis.
6. (original) The method of claim 5, further comprising:
  - receiving, on a per output port basis, a plurality of requests associated with that port, each request from the plurality of requests associated with that port being associated with a link from the plurality of links associated with that port and being associated with a candidate packet; and
  - sending, on a per output port basis, a grant associated with the selected link for that output port.
7. (original) The method of claim 6, further comprising:
  - determining, on a per input port basis, a subset of links from a plurality of links associated with that input port based on any grants received at that input port; and
  - selecting, on a per input port basis, at most one link from the determined subset of links associated with that input port and having a weight value greater than a weight value associated with each remaining link from the determined subset of links for that input port.
8. (original) The method of claim 1, wherein the determining and the selecting are performed on a per input port basis.
9. (original) The method of claim 8, further comprising:
  - receiving, on a per input port basis, a plurality of requests associated with that port, each request from the plurality of requests associated with that port being associated with a link from the plurality of links associated with that port and being associated with a candidate packet; and

sending, on a per input port basis, a grant associated with the selected link for that input port.

10. (original) The method of claim 9, further comprising:

determining, on a per output port basis, a subset of links from a plurality of links associated with that output port based on any grants associated with ~~received at~~ that output port; and

selecting, on a per output port basis, at most one link from the determined subset of links associated with that output port and having a weight value greater than a weight value associated with each remaining link from the determined subset of links for that output port.

11. (currently amended) A method for arbitrating for a switch fabric, comprising:

determining, for a first port, a link subset from a plurality of links associated with the first port, each link from the link subset being associated with its own candidate packet and being associated with its own weight value;

selecting a link from the link subset for the first port based on the weight value associated with each link from the link subset for the first port;

determining, for a second port, a link subset from a plurality of links associated with the second port, each link from the link subset associated with the second port being associated with its own candidate packet and being associated with its own weight value, the determining for the second port being performed in parallel with the determining for the first port; and

selecting a link from the link subset for the second port based on the weight value associated with each link from the link subset of associated with the second port, the selecting for the second port being performed in parallel with the selecting for the first port;

determining if any of the plurality of links associated with the first and second ports that are unassociated with the candidate packet has a corresponding weight value greater than the weight value of the corresponding selected link; and

if the corresponding weight value is greater than the weight value of the corresponding selected link, then the method includes,

decreasing the corresponding weight value.

12. (original) The method of claim 11, wherein the weight value associated with each link from the plurality of links associated with the first port corresponds to a priority between the first port and a remaining port associated with that link.

13. (currently amended) The method of claim 11, further comprising:

~~sending, from the first port,~~ a grant associated with link selected for the first port;

~~sending, from the second port,~~ a grant associated with the link selected for the second port;

    determining, for a third port, a subset of links from a plurality of links associated with the third port based on any grants received at the third port; and

    selecting, for the third port, at most one link from the determined subset of links associated with the third port based on the weight value associated with each link from the determined subset of links for the third port.

14. (original) The method of claim 11, wherein the first port is an output port and the second port is an output port.

15. (currently amended) The method of claim 14, further comprising:

~~receiving, at the first port,~~ a plurality of requests associated with the first port, each request from the plurality of requests associated with the first port being associated with a candidate packet;

~~sending, from the first port,~~ a grant associated with the selected link for first port;

    receiving, at the second port, a plurality of requests associated with the second port, each request from the plurality of requests associated with the second port being associated with a candidate packet; and

    sending, from the second port, a grant associated with the selected link for second port.

16. (currently amended) The method of claim 15, further comprising:

determining, for a first input port, a subset of links from a plurality of links associated with the first input port based on any grants associated with ~~received at~~ the first input port; and

selecting, for a first input port, at most one link from the determined subset of links associated with the first input port and having a weight value greater than a weight value associated with each remaining link from the determined subset of links for the first input port.

17. (original) The method of claim 11, wherein the first port is an input port and the second port is an input port.

18. (currently amended) The method of claim 17, further comprising:

~~receiving, at the first port,~~ a plurality of requests associated with the first port, each request from the plurality of requests associated with the first port being associated with a candidate packet;

~~sending, from the first port,~~ a grant associated with the selected link for first port;

~~receiving, at the second port,~~ a plurality of requests associated with the second port, each request from the plurality of requests associated with the second port being associated with a candidate packet; and

~~sending, from the second port,~~ a grant associated with the selected link for second port.

19. (currently amended) The method of claim 18, further comprising:

determining, for a first output port, a subset of links from a plurality of links associated with the first output port based on any grants associated with ~~received at~~ the first output port; and

selecting, for a first output port, at most one link from the determined subset of links associated with the first output port and having a weight value greater than a weight value associated with each remaining link from the determined subset of links for the first output port.

20. (currently amended) An apparatus, comprising:

a plurality of input ports;

a plurality of output ports each being coupled to each input port from the plurality of input ports by a link; ~~and~~

a first plurality of arbiters each being uniquely associated with its own output port from the plurality of output ports, the first plurality of arbiters ~~being configured to operate~~ operating in parallel with each other, a first arbiter from the first plurality of arbiters being associated with a first output port from the plurality of output ports, the first arbiter having a selection unit ~~configured to transmit~~ transmitting an arbitration signal based on a weight value associated with each link associated with the first output port and having a candidate packet; and

a second plurality of arbiters each being uniquely associated with its own input port from the plurality of input ports, the second plurality of arbiters operating in parallel with each other and with the first plurality of arbiters.

21. (currently amended) The apparatus of claim 20, further comprising:

an arbiter associated with a first input port from the plurality of input ports and having a selection unit ~~configured to receive~~ receiving at least one arbitration signal associated with ~~from~~ a respective output port from the plurality of output ports, the selection unit of the arbiter associated with the first input port being configured to transmit an arbitration signal based on a weight value associated with each link associated with the received at least one arbitration signal.

22. (cancelled)

23. (currently amended) The apparatus of claim 20 ~~22~~, wherein:

each arbiter from the second plurality of arbiters is configured to receive the arbitration signal from any arbiter from the first plurality of arbiters, an arbiter associated with a first input port from the plurality of input ports ~~being configured to transmit~~ transmitting an arbitration signal based on: (1) a weight value associated with each link associated with the first input port and (2) any arbitration signals received from the plurality of arbiters.

24. (currently amended) An apparatus, comprising:

a plurality of input ports;

a plurality of output ports each being coupled to each input port from the plurality of input ports by a link; ~~and~~

a first plurality of arbiters each being uniquely associated with its own input port from the plurality of input ports, the first plurality of arbiters operating ~~being configured to operate~~ in parallel with each other, a first arbiter from the first plurality of arbiters being associated with a first input port from the plurality of input ports, the first arbiter having a selection unit configured to transmit an arbitration signal based on a weight value associated with each link associated with the first input port and having a candidate packet and

a second plurality of arbiters each being uniquely associated with its own output port from the plurality of output ports, the second plurality of arbiters operating in parallel with each other and with the first plurality of arbiters..

25. (currently amended) The apparatus of claim 24, further comprising:

an arbiter associated with a first output port from the plurality of output ports and having a selection unit receiving ~~configured to receive~~ at least one arbitration signal from a respective input port from the plurality of input ports, the selection unit of the arbiter associated with the first output port being configured to transmit an arbitration signal based on a weight value associated with each link associated with the received at least one arbitration signal.

26. (cancelled)

27. (currently amended) The apparatus of claim 24 ~~26~~, wherein:

each arbiter from the second plurality of arbiters is configured to receive the arbitration signal from any arbiter from the first plurality of arbiters, an arbiter associated with a first output port from the plurality of output ports ~~being configured to transmit~~ transmitting an arbitration signal based on: (1) a weight value associated with each link associated with the first output port and (2) any arbitration signals received from the plurality of arbiters.

Claims 28-33 (cancelled)

34. (currently amended) A method for arbitrating for a switch, comprising:  
determining, in a first time slot, a plurality of grants associated with a plurality of ~~output~~ arbiters associated with output ports; and  
determining, in the first time slot, a plurality of grants associated with a plurality of ~~input~~ arbiters associated with input ports.

35. (currently amended) The method of claim 34, further comprising:  
determining, in a second time slot, a plurality of accepts associated with the plurality of ~~input~~ arbiters associated with input ports based on the plurality of grants determined for the plurality of ~~output~~ arbiters associated with output ports in the first time slot; and  
determining, in the second time slot, a plurality of accepts associated with the plurality of ~~output~~ arbiters associated with output ports based on the plurality of grants determined for the plurality of ~~input~~ arbiters associated with input ports in the first time slot.

36. (currently amended) The method of claim 35, further comprising:  
generating a plurality of arbitration selections based on the plurality of accepts associated with the plurality of ~~input~~ arbiters associated with input ports and based on the plurality of accepts associated with the plurality of ~~output~~ arbiters associated with output ports.

37. (currently amended) The method of claim 35, further comprising:  
selecting one from the group of (1) the plurality of accepts associated with the plurality of ~~input~~ arbiters associated with input ports, and (2) the plurality of accepts associated with the plurality of ~~output~~ arbiters associated with output ports, based on an optimal throughput associated with that selected group.

38. (currently amended) The method of claim 35, further comprising:



selecting a plurality of arbitration selections based on the plurality of accepts associated with the plurality of ~~input~~ arbiters associated with input ports and based on the plurality of accepts associated with the plurality of ~~output~~ arbiters associated with output ports, the plurality of arbitration selections having a first portion and a second portion, the first portion of the plurality of arbitration selections being associated with a portion from the plurality of accepts associated with the plurality of ~~input~~ arbiters associated with input ports, the second portion of the plurality of arbitration selections being associated with a portion from the plurality of accepts associated with the plurality of ~~output~~ arbiters associated with output ports.

39. (currently amended) A method for arbitrating for a switch, comprising:

determining a grant for a first output arbiter from a plurality of ~~output~~ arbiters associated with output ports;

determining a grant for a first input arbiter from a plurality of ~~input~~ arbiters associated with input ports, the determining the grant for the first input arbiter being performed in parallel with the determining the grant for the first output arbiter;

determining an accept for a second input arbiter from the plurality of ~~input~~ arbiters associated with input ports based on the determined grant for the first output arbiter; and

determining an accept for a second output arbiter from the plurality of ~~output~~ arbiters associated with output ports based on the determined grant for the first input arbiter, the determining the accept for second output arbiter being performed in parallel with the determining the accept for the second input arbiter.

40. (currently amended) The method of claim 39, further comprising:

selecting one ~~from the group~~ of: (1) the accept for the second input arbiter and (2) the accept for the second output arbiter.

41. (original) The method of claim 39, further comprising:

selecting, for a first time slot, one from the group of: (1) the accept for the second input arbiter and (2) the accept for the second output arbiter, the

determining the accept for the second input arbiter and the accept for the second output arbiter being performed for the first time slot; and

selecting, for a second time slot, one from the group of: (1) an accept for the second input arbiter for the second time slot and (2) an accept for the second output arbiter for the second time slot.

42. (original) A method for arbitrating for a switch fabric, comprising:

determining, for a first output port from a plurality of output ports, a link from a plurality of links associated with the first output port based on a weight value associated with each link from a subset of links from the plurality of links, each link from the subset of links being associated with its own candidate packet; and

determining, for a first input port from a plurality of input ports, a link from a plurality of links associated with the first input port based on a weight value associated with each link from a subset of links from the plurality of links, each link from the subset of links being associated with its own candidate packet, the determining for the first input port being performed in parallel with the determining for the first output port.

43. (original) The method of claim 42, further comprising:

selecting, for a second output port from the plurality of output ports, a link from a plurality of links associated with the second output port including the link determined for the first input port, the selecting for the second output being based on a weight value associated with each link from the plurality of links associated with the second output port; and

selecting, for a second input port from the plurality of input ports, a link from a plurality of links associated with the second input port including the link determined for the first output port, the selecting for the second input being based on a weight value associated with each link from the plurality of links associated with the second input port, the selecting for the second input port being performed in parallel with the selecting for the second output port.

44. (currently amended) The method of claim 43 42, wherein:

the link selected for the second output port is selected from a subset of links from plurality of links for the second output port, each link from the subset of links associated with the second output port is associated with a determination of a corresponding input port; and

the link selected for the second input port is selected from a subset of links from plurality of links for the second input port, each link from the subset of links associated with the second input port is associated with a determination of a corresponding output port.

45. (currently amended) An apparatus, comprising:

a plurality of first-stage arbiters; and

a plurality of second-stage arbiters each associated with the plurality of first-stage arbiters,

each first-stage arbiter from the plurality of first-stage arbiters sending ~~being configured to send~~ its own grant signal to a second-stage arbiter from the plurality of second-stage arbiters during a first time slot, each second-stage arbiter from the plurality of second-stage arbiters sending ~~being configured to send~~ its own grant signal to a first-stage arbiter from the plurality of first-stage arbiters during the first time slot.

46. (currently amended) The apparatus of claim ~~45~~ 46, wherein:

a first ~~first-stage~~ arbiter from the plurality of first-stage arbiters receiving ~~being configured to receive~~ at least one grant from a second-stage arbiter from the plurality of second-stage arbiters during a second time slot, the first ~~first-stage~~ arbiter sending ~~being configured to send~~ an accept signal based on any grant received from a second-stage arbiter from the plurality of second-stage arbiters; and

a first ~~second-stage~~ arbiter from the plurality of second-stage arbiters receiving ~~being configured to receive~~ at least one grant from a first-stage arbiter from the plurality of first-stage arbiters during the second time slot, the first ~~second-stage~~ arbiter sending ~~being configured to send~~ an accept signal based on

any grant received from a first-stage arbiter from the plurality of first-stage arbiters.

47. (currently amended) The apparatus of claim 46, further comprising:

a matching combiner coupled to the plurality of first-stage arbiters and the plurality of second-stage arbiters, the matching combiner receiving ~~configured to receive~~ a plurality of accept signals from the plurality first-stage arbiters and ~~to receive~~ receiving a plurality of accept signals from the plurality of second-stage arbiters, the matching combiner sending ~~configured to send~~ a plurality of arbitration selections based on the plurality of accept signals from the plurality first-stage arbiters and the plurality of accept signals from the plurality of second-stage arbiters.

48. (new) The method of claim 1, wherein decreasing the corresponding weight value is performed according to a link bandwidth.

49. (new) The method of claim 11, wherein decreasing the corresponding weight value is performed according to a link bandwidth.